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TITLE: **UPRIGHT TYPE VACUUM CLEANER**

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PATENT SPECIFICATION TITLE PAGE

UPRIGHT TYPE VACUUM CLEANER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an upright type vacuum cleaner having a cyclone dust collecting apparatus, and more particularly, to an upright type vacuum cleaner having a cyclone dust collecting apparatus and a removable dust barrel.

2. Description of the Related Art

Generally, an upright type vacuum cleaner having a cyclone dust collecting apparatus has a suction brush that is connected to a cleaner body and moved along a cleaning surface. The interior of the cleaner body is divided into a dust collecting chamber, in which the cyclone dust collecting apparatus is removably installed, and a motor driving chamber, in which a motor is installed. During operation, the motor generates a strong suction force at the suction brush. The suction force draws air and contaminants on the cleaning surface into the cleaner body. After being drawn in through the suction brush, the air and contaminants are drawn into the cyclone dust collecting apparatus, installed in the dust collecting chamber of the cleaner body. The cyclone dust collecting apparatus guides the air into a vortex that whirls at a high speed. The vortex of air has a centrifugal force, by which the contaminants are separated from the air. The contaminants are then collected in the cyclone dust collecting apparatus, and the clean air is discharged out through the motor driving chamber.

As shown in FIG. 1, the cyclone dust collecting apparatus 10 includes a cyclone body 11 and a cyclone housing 12. The cyclone housing 12 includes a centrifugal separating chamber 12a and a dust barrel 12b. The centrifugal separating chamber 12a has an opening that interconnects the centrifugal chamber 12a with the dust barrel 12b. Accordingly, the air drawn into the cyclone body 11 forms the vortex current in the centrifugal separating chamber

12a. By the centrifugal force of the vortex air, the contaminants are separated from the air, and guided into the dust barrel 12b through the opening 12c. Thus, the contaminants are collected in the dust barrel 12b.

The process of emptying the cyclone dust collecting apparatus 10 of the upright type vacuum cleaner, when it is full with contaminants and dust, will be described below. First, the cyclone dust collecting apparatus 10 is removed from the dust chamber. Next, the cyclone housing 12, which holds the contaminants and dust, is separated from the cyclone body 11 of the cyclone dust collecting apparatus 10. The user then dumps the contaminants and dust from the dust barrel 12b of the cyclone housing 12 into a dustbin.

The arrangement described above is inconvenient for a user, since the user has to first separate the cyclone dust collecting apparatus 10 from the dust chamber and then separate the dust barrel 12b from the cyclone housing 12 in order to empty the dust barrel 12b of the cyclone housing 12.

SUMMARY OF THE INVENTION

The present invention has been made to overcome the above-described problems of the related art. Accordingly, it is an object of the present invention to provide an upright type vacuum cleaner having a cyclone dust collecting apparatus enabling a user to dump contaminants collected therein easily without separating the entire cyclone dust collecting apparatus from the vacuum cleaner. The user need only remove the dust barrel, which holds the contaminants, from the vacuum cleaner in order to dispose of the contents in the dust barrel.

The above object is accomplished by an upright type vacuum cleaner including a cleaner body having an upper dust chamber, a lower motor driving chamber housing a motor, and an air inflow path and an air outflow path for interconnecting the upper dust chamber and

the lower motor driving chamber. The vacuum cleaner further includes a cyclone body mounted in an upper portion of the dust chamber, and a dust barrel removably mounted on a lower side of the cyclone body. The cyclone body is connected with the air inflow path and the air outflow path. A suction brush, which is mounted on a lower portion of the cleaner body, is movable along a cleaning surface. The vacuum cleaner further includes fine dust filtering means removably disposed on the air inflow path and the air outflow path.

The cyclone body includes a cover having an open end and a closed end, and a contaminant discharge port formed in the closed end. The cyclone body also includes a head portion having an air inflow pipe connected to the air inflow path for guiding the air in a diagonal direction with respect to the cover, an air outflow pipe having one end connected to a grille that extends toward the closed end of the cover and is connected to the air outflow path.

The closed end of the cover preferably includes a spiral surface. Also, the dust barrel is substantially cylindrical in shape and has an open end and a closed end. The open end of the dust barrel aligns with the closed end of the cyclone body.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and other features and advantages of the present invention will be clarified by the following description with the attached drawings, in which:

FIG. 1 is a perspective view of a cyclone dust collecting apparatus employed in a conventional upright type vacuum cleaner;

FIG. 2 is a perspective view of an upright type vacuum cleaner including a cyclone dust collecting apparatus in accordance with the present invention;

FIG. 3 is an exploded perspective view of the cyclone dust collecting apparatus shown in FIG. 2;

FIG. 4 is an exploded perspective view of a locking/unlocking means for the cyclone dust collecting apparatus of FIG. 2;

FIGS. 5A and 5B are sectional views showing the operation of the locking/unlocking means of FIG. 2; and

FIG. 6 is a partial sectional view showing the upright type vacuum cleaner of FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 2, an upright vacuum cleaner includes a cleaner body 20, a suction brush 50 mounted on a lower side of the cleaner body 20, a cyclone dust collecting apparatus 30 removably mounted in the cleaner body 20, and a filtering means 40 for filtering fine dust and contaminants.

The cleaner body 20 includes a dust chamber 21 for housing the cyclone dust collecting apparatus 30, a motor driving chamber 22 for housing a motor (not shown), and a filter chamber 23 for housing the filtering means 40. The cyclone dust collecting apparatus 30 is connected to an end of an inflow path 25 formed in the cleaner body 20 and to an end of a discharge path 26. The other end of the inflow path 25 is in communication with the suction brush 50. Accordingly, air and the contaminants entrained in the air are drawn from the cleaner surface into the cyclone dust collecting apparatus 30 through the inflow path 25. Further, the other end of the discharge path 26 is connected to the motor driving chamber 22. The filter chamber 23 is provided in the discharge path 26. Accordingly, when the air is discharged from the cyclone dust collecting apparatus 30, the air flows through the discharge path 26, the filter chamber 23, and the motor driving chamber 23, to the outside. The filter chamber 23 includes an air inlet 23a, corresponding to the discharge path 26, and an air outlet 23b, corresponding to the motor driving chamber 22. The air inlet 23a is formed on an inner

side of the filtering chamber 23, while the air outlet 23b is formed on a bottom of the filtering chamber 23.

The suction brush 50 is mounted on a lower side of the cleaner body 20 and is movable along the cleaning surface. The vacuum cleaner motor, which is in the motor driving chamber 22, generates a suction force, so that the suction brush draws in the ambient air together with fine dust and contaminants from the cleaning surface. It is preferable that the suction brush 50 is movably mounted on the cleaner body 20.

The cyclone dust collecting apparatus 30 includes a cyclone body 31 and a dust barrel 37. FIG. 3 provides a more detailed illustration of the cyclone dust collecting apparatus 30. The cyclone body 31 includes a head portion 32 and a cover 34. The head portion 32 includes an inflow pipe 32a connected to the inflow path 25, a discharge pipe 32b connected to the discharge path 26, and a grille 33 for filtering the dust. The head portion 32 is connected to an upper end of the cover 34. While one end of the inflow pipe 32a is connected to the inflow path 25, the other end of the inflow pipe 32a is formed so as to discharge the air in a diagonal direction with respect to the cover 34. The grille is substantially cylindrical in shape and extends down toward a closed end of the cover 34. The grille has a plurality of fine holes formed in its surface.

The cover is also substantially cylindrical in shape and has an open end and a closed end. A contaminant discharge port is formed in the closed end of the cover 34. The contaminant discharge port may be an opening of a predetermined size, or more preferably, a spiral surface 35 along which the contaminants can be discharged to the dust barrel 37 smoothly. A starting edge and an ending edge of the spiral surface 35 may be arranged on a same point, or the starting side may overlap a certain area of the ending side.

Here, it is preferable that the cyclone body 31 is secured to the dust chamber 21 by a separate fastening member (not shown).

The dust barrel 37 is substantially cylindrical in shape and has an open end and a closed end. The open end of the dust barrel 37 aligns with the closed end of the cyclone body 31. It is preferable that a handle 39 is formed on a sidewall of the dust barrel 37 to facilitate handling of the dust barrel 37.

Referring back to FIG. 2, the filtering means 40 includes an air filter 41 and a filter casing 43. The air filter 41 is formed of a material having a plurality of fine holes to filter fine dust particles, which were not separated out by the cyclone dust collecting apparatus 30. Any conventional air filter for a vacuum cleaner may serve the function of the air filter 41, and accordingly, the detailed description thereof is omitted. The filter casing 43 houses the air filter 41 and is removably disposed in the filter chamber 23. The filter casing 43 includes an inflow port 43a (FIG. 6) connected to the discharge path 26, and an outflow port 43b (FIG. 6) connected to the motor driving chamber 22. Accordingly, the inflow port 43a of the filter casing 43 corresponds to the air inlet 23a of the filtering chamber 23, while the outflow port 43b thereof corresponds to the air outlet 23b.

The dust chamber 21 includes a locking/unlocking means 60 for mounting and removing the dust barrel 37 from the cyclone dust collecting apparatus 30. The locking/unlocking means 60, which is best illustrated in FIG. 4, includes a slanted recess 38 formed on a lower end of the dust barrel 37, a fixing member 61 having a protrusion 61a that is received in the slanted recess 38, and a base 62 for supporting fixing member 61 and the cyclone dust collecting apparatus 30. The base 62 supports the fixing member 61 for movement of the fixing member 61 with respect to the slanted recess 38.

The slanted recess 38 is formed in a spiral fashion and has a depth that gradually increases from a center of the lower end of the dust barrel 37 to an outer edge of the lower end.

The fixing member 38 includes a rotary pin 61c, a rotary handle 61b and the protrusion 61a. The rotary pin 61c is formed on one end of the fixing member 61 and serves as a pivot. The rotary handle 61b is formed at the other end of the fixing member 61, and the protrusion 61a is located between the two ends. The protrusion 61a extends upward from the base 62 to engage the slanted recess 38.

The base 62 includes a connecting protrusion 62b corresponding to a guide protrusion (not shown) formed on an inner wall of the dust chamber 21 for removably mounting the base 62 in the dust chamber 21. The base 62 also has a hole 62a formed therein. The hole 62a receives the rotary pin 61c of the fixing member 61.

Accordingly, when the user turns the rotary handle 61b of the fixing member 61 to a predetermined direction (counterclockwise direction in FIG. 5A), the fixing member 61 pivots about the rotary pin 61c, and the protrusion 61a moves along the slanted recess 38. Accordingly, as shown by the dotted line in FIG. 6, the dust barrel 37 is lowered to a position where the dust barrel 37 is disengaged from the cyclone body 31.

Albeit not shown, the locking/unlocking means 60 can be formed into various designs.

The operation of the upright type vacuum cleaner constructed as above according to the preferred embodiment of the present invention will be described below.

First, when the motor of the motor driving chamber 22 operates, a suction force is generated at the suction brush 50. The suction force enables the suction brush 50 to draw ambient air and contaminants and dust on the cleaning surface into the cyclone body 31 through the inflow path 25. The air is guided through the inflow path 32a in a diagonal direction along the inner circumference of the cover 34, forming a vortex of air. During this process, the centrifugal force of the vortex of air separates the contaminants and dust from the air. The dust and contaminants pass along the spiral surface 35 and are discharged to the dust barrel 37. Such separated contaminants and dust are received and collected in the dust barrel

37. The spiral surface 35 of the cover 34 prevents a backflow of the contaminants and dust from re-entering the cover 34.

Meanwhile, the cleaner air is passed through the fine holes of the grille 33 of the head portion 32 and is discharged through the discharge pipe 32b. Then the air flows through the discharge pipe 32b and the discharge path 26 into the filter casing 43 of the filter chamber 23. In the filter casing 43, fine dust particles in the air, which were not separated out by the cyclone dust collecting apparatus 30, are filtered out at the air filter 41, and the clean air is drawn into the motor driving chamber 23 and discharged outside.

Next, the process of removing and re-inserting the dust barrel 37 will be described.

When the dust barrel 37 is full of contaminants and dust, the user grabs the handle 61b of the fixing member 61 and turns the fixing member in a counterclockwise direction, from the position shown in FIG. 5A to that shown in FIG. 5B. Accordingly, the protrusion 61a of the fixing member 61 is moved along the slanted recess 38 from the center to the outer edge of the dust barrel 37. As described above, since the depth of the slanted recess 38 increases from the center to the outer edge of the dust barrel 37, when the protrusion 61a of the fixing member 61 reaches the end of the slanted recess 38 adjacent to the outer edge of the dust barrel 37, the dust barrel 37 is lowered and thus separated from the cyclone body 31.

The user then grabs the handle 39 of the dust barrel 37 to remove the dust barrel 37 from of the dust chamber 21 and dispose of the contaminants and dust that have collected in the dust barrel 37.

In order to clean an interior of the dust chamber 21, the user can pull out the base 62 together with the dust barrel 37 and the fixing member 61.

Meanwhile, in order to re-insert the dust barrel 37 in the dust chamber 21, the user mounts the base 62 in the dust chamber 21 and then mounts the fixing member 61 on the base 62, by aligning and inserting the rotary pin 61c to the hole 62b of the base 62. Then the user

aligns the protrusion 61b of the fixing member 61 with the slanted recess 38 and mounts the dust barrel 37 on the fixing member 61.

Then the user grabs the handle 61b and turns the fixing member in a clockwise direction from the position shown in FIG. 5B to that shown in FIG. 5A. Accordingly, by the movement of the protrusion 61 along the slanted recess 38 to raise the dust barrel 37 into connection with the cyclone body 31.

As described above, the upright type vacuum cleaner of the present invention simplifies disposal of collected contaminants and dust, since the user does not have to separate the entire cyclone dust collecting apparatus 30 from the dust chamber 21. Instead, the user only has to separate the dust barrel, which actually holds the contaminants and dust, from the cyclone dust collecting apparatus 30.

Although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiment. Various changes and modifications can be made within the spirit and scope of the present invention as defined by the appended claims.